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14. ABSTRACT Our preliminary hypothesis is that there are factors, biological and psychosocial, that increase or reduce vulnerability to PrUs among spinal cord injured persons. A data extraction tool was created based on variables that are thought to impact PrU development. A retrospective review of 120 randomly sampled charts from patients undergoing the SCI Comprehensive Preventive Health Evaluation between Jan 1 and Dec 31, 2009 was conducted using this data extraction tool. This sample, which focuses on outpatient veterans with SCI, represents an older population than previously studied (mean age across all groups=62). 74% sustained their injury more than 10 years ago. 39% of the index sample reported never having a pressure ulcer, while 31% had ≥ 3 pressure ulcers since the time of injury. Key findings include: 1) Prolonged history of smoking is predictive of pressure ulcer vulnerability, 2) Advanced age does not increase PrU risk, 3) FIM score ≤ 87 predicts increased PrU risk, and 4) BMI of 26-30 may be protective. These data combined with additional risk factors identified in the literature will be validated in a prospective study with the objective to identify and protect SCI persons at highest risk of developing PrUs.					
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Introduction:

Most published research that identifies risk factors for development and recurrence of Pressure Ulcers (PrUs) has been conducted in the nursing home elderly or in the SCI Model systems (sponsored by NIDRR) ,which includes primarily acute injuries. The literature examining risk and recurrence of PrUs in the Veteran SCI population, i.e., long-term chronic SCI, focuses on the patients who have already developed PrUs. Those who do not develop PrUs are excluded, thereby excluding a critical ‘control’ population. Although more than 200 risk factors have been identified as being involved in PrU development, it is not clear how to stratify them into useful guidelines for PrU prevention. This retrospective survey of SCI outpatients completing their annual SCI Comprehensive Preventive Health Evaluation is based on our preliminary hypothesis is that there are factors, biological and psychosocial that increase or reduce vulnerability to PrUs among spinal cord injured persons. The data obtained from this research will be used to identify and stratify the factors that are different between patients who have never had a pressure ulcer and those who suffer from multiple ulcers, with emphasis on modifiable risk factors. Subsequent studies will then refine this list prospectively, leading to the development of evidence-based risk assessment tools and customized interventions that will be tested in future randomized controlled trials.

Body:

Objectives/Specific Aims:

The purpose of this study is to conduct a retrospective chart review. Specifically we intend to refine the list of potential factors that increase or decrease vulnerability of community dwelling SCI persons to PrUs.

Research Design:

Utilizing a computer generated list, 120 patient charts were randomly selected from the nearly 1400 patients with SCI who completed their SCI Comprehensive Preventive Health Evaluation at the James A Haley Veterans Hospital in Tampa between Jan 1 and Dec 31, 2009. Patients with or without pressure ulcers were included. Patients with SCI due to terminal disease, multiple sclerosis or amyotrophic lateral sclerosis were excluded. A data extraction tool was used to compile information known to impact the development of pressure ulcers in persons with SCI. This included demographics, biological and physical factors and psychosocial aspects. The local Institutional Review board for Human Subjects Research and the local Veterans Affairs Research and Development Committee approved the study.

Results:

The mean age across all groups was 62 ± 12.5 . 74% of the population studied sustained their spinal cord injury more than 10 years ago, with 35.5% more than 30 years ago. Similar to other VA studies, 98% were male with the majority Caucasian. 43% were quadriplegic. They are also a population with significant co-morbidities: 29.2% currently use tobacco, 37% of those smoke at least one pack per day; 22.7% have BMI >30 and 30% have been diagnosed with depression. More than half had greater than 50% service connection, although not necessarily related to their spinal cord injury. Of the 120 patients, 39.5% reported never having a pressure ulcer, 29.5% had 1-2 PrUs and 31% had ≥ 3 pressure ulcers since the time of injury. Although 26% healed their pressure ulcers rapidly (0-3 months), 10% of the patients have never successfully healed their ulcer, contending with a chronic open wound. Factors increasing PrU vulnerability include: Violence as a mechanism of injury, FIM score ≤ 87 , ASIA-A, BMI ≤ 25 , lifetime tobacco exposure ≥ 30 pack years. Diabetes, age >65 and duration of injury were not significantly different between the three groups and therefore do not appear to be risk factors in this population. Patients with ≥ 3 PrUs were noted to be anemic and have lower albumin and pre-albumin than those without PrUs. This is likely to be a consequence rather than a cause. The data set also identified a number of variables that are not easily extracted from the electronic medical record (either could not be found or were not present), including contractures, use of specialized support surfaces, means of transportation, mobility, caregiver status, bowel and bladder continence, level of education, mental health status or illicit drug use.

Key Research Accomplishments:

The retrospective survey of 120 patients is complete.

Reportable Outcomes:

- 1) The manuscript to describe the retrospective survey is in progress.
- 2) Based on the difficulty encountered in manually extracting data from the electronic medical record (CPRS) a proposal entitled **Leveraging Information in the EHR to Measure Pressure Ulcer Risk in Veterans with SCI** was developed with Stephen L. Luther, PhD as PI, Gould as one of the Co-I's. This project, which was recently funded by VA HSR&D has the following aims: 1) Develop natural language processing (NLP) programs to identify the occurrence of PrUs; 2) Develop predictive models of occurrence of PrUs based on available structured data for early impact on PrU risk assessment; 3) Develop NLP programs to reliably extract information about potential predictors from text in clinical notes; 4) Combine risk information obtained through structured and text extracted NLP data, and develop robust risk assessment predictive of PrUs.

Conclusions:

Pressure ulcers (PrU) are among the most significant complications in Veterans with spinal cord injury (SCI) in terms of quality of life and cost of care. This retrospective study is the first of its kind to describe patient characteristics and pressure ulcer incidence of community dwelling, spinal cord injured veterans. The average age and duration of spinal cord injury indicate that this is indeed a study of chronic SCI and has identified several modifiable factors that may increase PrU risk as well as identification of factors that put individuals at increased risk for development of Pressure Ulcers. The ultimate goal is to develop an SCI-specific tool that can be used by the provider and patient to identify and modify risk factors that lead to pressure ulcer vulnerability, thereby reducing the lifetime risk and burden chronic non-healing wounds.

References:

1. Bates-Jensen BM, Guihan M, Garber SL, Chin AS, Burns SP. Characteristics of recurrent pressure ulcers in veterans with spinal cord injury. *J Spinal Cord Med* 2009;32(1):34-42.
2. Byrne DW, Salzberg CA. Major risk factors for pressure ulcers in the spinal cord disabled: a literature review. *Spinal Cord* 1996;34(5):255-63.
3. Carlson CE, King, R.B., Kirk, P.M., Temple, R., Heinemann, A. Incidence and correlates of pressure ulcer development after spinal cord injury. *J Rehabil Nurs Res* 1992;1 :34-40.
4. Fuhrer MJ, Garber SL, Rintala DH, Clearman R, Hart KA. Pressure ulcers in community-resident persons with spinal cord injury: prevalence and risk factors. *Arch Phys Med Rehabil* 1993;74(1 1):1 172-7.
5. Garber SL, Rintala DH, Hart KA, Fuhrer MJ. Pressure ulcer risk in spinal cord injury: predictors of ulcer status over 3 years. *Arch Phys Med Rehabil* 2000;81(4):465-71.
6. Garber SL, Rintala DH. Pressure ulcers in veterans with spinal cord injury: a retrospective study. *J Rehabil Res Dev* 2003 ;40(5):433-41.
7. Guihan M, Garber SL, Bombardier CH, Goldstein B, Holmes SA, Cao L. Predictors of pressure ulcer recurrence in veterans with spinal cord injury. *J Spinal Cord Med* 2008;31(5): 551-559
8. Henzel MK, Bogie KM, Guihan M, Ho CH. Guest Editorial: Pressure ulcer management and research priorities for patients with spinal cord injury: Consensus opinion from SCI QUERI Expert Panel on Pressure Ulcer Research Implementation. *J Rehabil Res Dev*. 2011;48(3):xi-xxxii.
9. Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: a systematic review. *JAMA* 2006;296(8):974-84.
10. Yarkony GM, Heinemann, A.W. Spinal cord injury: Clinical outcomes from the model systems. In: Stover SL, DeLisa, J.A., Whiteneck, G.G., editor. *Pressure Ulcers*. Gaithersburg, MD: Aspen Publishing, 1995.